Abstracts

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A New Intercostal Artery Management Strategy for Thoracoabdominal Aortic Aneurysm Repair

Mell MW, Wynn MM, Reeder SB, et al. J Surg Res 2009;54:99-104.

Conclusion: Identification of the anterior spinal artery, artery of Adamkiewicz with magnetic resonance angiography (MRA), and subsequent selective reimplantation of intercostal arteries during open thoracoabdominal aneurysm (TAA) repair may serve as an effective additional adjunct in reducing immediate or delayed paraplegia after repair of TAAs.

Summary: Spinal cord ischemia (SCI) before the use of perioperative protective measures occurred in 16% to 31% of patients undergoing TAA repair. Advances in surgical technique, postoperative care, and anesthetic management have been introduced to address the rate of SCI after TAA repair. Intraoperative techniques have contributed to a reduction in the occurrence of SCI with TAA repair. Some have used spinal angiography to identify critical intercostal arteries; however, the technique has proved difficult to use and is associated with some risk. Current advances in computed tomography angiography (CTA) and MRA have made it possible to noninvasively identify important intersegmental arteries in patients undergoing TAA repair.

In this article the authors introduce a new adjunct for TAA repair that involves the perioperative identification and selective implantation of critical intercostal arteries based on preoperative MRA imaging. Included in this study were patients undergoing TAA repair from August 2005 to September 2007 at the University of Wisconsin. Spinal artery MRA was used to identify the anterior spinal artery and its major intercostal source preoperatively. Patients received intraoperative spinal cord protection using standard adjuncts. Intercostal arteries felt to be important were preserved or reimplanted as a button after removal of aortic clamps. Perioperative and demographic data were retrospectively collected.

MRA of the spinal artery was performed in 27 patients with identification of the anterior spinal artery in 85% of the studies. Open repair was performed in 74% and endovascular repair in 26%. The major intercostal source artery for the anterior spinal artery was preserved or reimplanted in 13 patients (65%) who underwent open repair. In seven patients (35%), there was no attempt to preserve or reimplant any intercostal arteries because the major source artery for the anterior spinal artery was not identified, was diminutive (<1.5 mm in diameter), not accessible, or was associated with significant calcification. In the patients undergoing reimplantation, a mean of 1.67 intercostal arteries were reimplanted (range, 1-3). Of the patients undergoing endovascular repair, the major source intercostal artery for the anterior spinal artery was covered in all cases. No immediate or delayed paraplegia developed in any patient in either group.

Comment: The new adjunct here is essentially selective reimplantation of intercostal arteries based on preoperative MRA imaging. It is impossible to know whether this strategy will provide any additional benefit in reducing SCI. In many patients in the open cohort, "important" intercostal arteries were not reimplanted for technical reasons, and all of the patients who underwent endovascular repair and in whom "important" intercostal arteries were identified preoperatively, those arteries were covered during the course of the endovascular repair. No cases of paraplegia were documented in the reimplanted or non-reimplanted patients treated with open repair, or in any of those treated with endovascular repair. The potential utility of this approach is that if you are a selective "reimplanter" of intercostal arteries during TAA repair it is possible, perhaps, with preoperative MRA of the spinal cord circulation, to identify precisely which intercostal arteries to reimplant. Whether this strategy will ultimately result in decreased rates of paraplegia will require a relatively large, multicenter randomized trial and is very unlikely ever to be performed.

AMS INSIGHT—Absorbable Metal Stent Implantation for Treatment of Below-the-Knee Critical Limb Ischemia: 6-Month Analysis

Bosiers M, and the AMS INSIGHT Investigators. Cardiovasc Intervent Radiol 2009;2:424-35.

Conclusion: Implantation of absorbable metal stents (AMSs) in below knee popliteal arteries is safe but does not result in increased efficacy over standard percutaneous angioplasty of infrapopliteal vessels.

Summary: Given the poor patency of infrapopliteal percutaneous revascularizations, a number of strategies are being investigated in patients with critical limb ischemia who have infrapopliteal occlusive disease. The permanent presence of an artificial implant may contribute to restenosis of a stented vessel. Stenting technology has led to the development of temporary implants composed of biocompatible materials that can support the vessel during the period of high risk for recoil but then completely degrade over the long term. Bioabsorbable stents serve as a means to mechanically prevent vessel recoil while avoiding the theoretic disadvantage of a long-term metallic implant.

This study investigated the safety and efficacy of AMSs in infrapopliteal arteries. Clinical follow-up was at 1 and 6 months, and efficacy was determined at 6 months by angiogram. There were 117 patients with 149 lesions and critical limb ischemia (Rutherford categories 4 and 5) who were randomized to implantation of an AMS (60 patients, 74 lesions) or stand-alone percutaneous transluminal angioplasty (PTA; 57 patients, 75 lesions). Seven PTA group patients crossed over to the stenting group. Lesions stented had to have a >50% diameter reduction with a vessel diameter of between 3 and 3.5 mm and a lesion length of <15 mm. The primary safety end point was absence of major amputation or death ≤30 days after the index intervention. Primary efficacy end point was 6-month angiographic patency.

The 30-day complication rate for patients randomized to PTA alone was 5.3% (3 of 57) and that for AMS implantation was 5% (3 of 60). An intention to treat analysis showed angiographic patency for lesions treated with AMS (31.8%) was lower than that for patients treated with PTA alone (58.0%; $P = .013$).

Comment: The study confirms low short-term patency of infrapopliteal percutaneous interventions. It is disappointing that the bioabsorbable stents did not improve patency of infrapopliteal interventions, and in fact, appeared to be associated with worse results. The current results do not support the positive clinical outcome of the initial AMS findings in a small cohort of patients (J Endovasc Ther 2005;12:1-5). The technology appears safe, but the stent will need to be improved and re-evaluated before commercial use can be considered an option. Once again, the complex biology of atherosclerosis and intimal hyperplasia appears to have beaten some clever engineers.

Aortic Arch Plaques and Risk of Recurrent Stroke and Death

Di Tullio MR, Russo C, Jin Z, and the Patent Foramen Ovale in Cryptogenic Stroke Study Investigators. Circulation 2009;19:2376-82.

Conclusion: Large aortic plaques are associated with an increased risk of recurrent stroke and death at 2 years, even when patients are treated with aspirin or warfarin therapy.

Summary: Large aortic plaques (4 mm), as determined by transesophageal echocardiography (TEE), confer an increase risk of stroke (J Am Coll Cardiol 1994;23:1085-90). Ulceration and superimposed thrombi appear to increase risk as well (Am Heart J 2000;139:329-36). It is assumed, without much evidence, that anticoagulation or antiplatelet agents, or both, prevent stroke in patients with large aortic plaques. In this study the authors sought to define event rates in patients with stroke who had large aortic plaques. Patients were randomly assigned in a double-blind fashion to warfarin or aspirin treatment. The primary end point was recurrent ischemic stroke or death resulting from any cause. Recurrent ischemic stroke was a new lesion on magnetic resonance imaging or computed tomography scanning. If new lesions were absent, a clinical syndrome consistent with stroke lasting >24 hours was considered an end point.

There were 516 patients with ischemic stroke who were double-blindly randomized. Large plaques (>4 mm) were present in 19.6% of patients, and large complex plaques, defined as those with mobile components or ulcerations, were seen in 8.5%. During the 2-year follow-up period, large plaques were associated with an increase risk of events (adjusted hazard ratio [HR], 2.12; 95% confidence interval [CI], 1.04-4.32). The HR was also increased in those with complex plaque morphology (HR, 2.55; 95% CI, 1.10-5.89). In patients with cryptogenic stroke, the HR was higher for both large plaques (HR, 6.42; 95% CI, 1.62-25.46) and large complex plaques (HR, 9.50; 95% CI, 1.92-47.10). There were no differences in event rates in the warfarin and aspirin groups compared with the overall study population (16.4% vs 15.8%; $P = 0.43$).

Comment: In this study large aortic plaques were associated with a doubling of the risk of recurrent stroke and death despite medical therapy. There was no difference between aspirin and warfarin therapy, and both therapies were relatively ineffective. The HRs observed in this report appeared only slightly lower than those previously reported from studies where treatment was not randomized or even not prescribed (J Am Coll Cardiol 1994;23:1085-90). The study suggests that neither warfarin nor aspirin significantly affect the risk of stroke associated with large aortic plaques.

Aspirin vs Anticoagulation in Carotid Artery Dissection: A Study of 298 Patients

Georgiadis D, Arnold M, von Buedingen HC, et al. Neurology 2009;72:1810-5.